



## ***Search for Life on Other Worlds: Observing and Classifying Life***

### **DESCRIPTION**

These activities will challenge students to make observations regarding the physical traits of living things with the intent to classify them through comparisons and contrasts. These traits will then be evaluated to presume the benefits they might afford a creature living in one habitat or another.

### **NASA SUMMER OF INNOVATION**

#### **GRADE LEVELS**

*4 – 6*

#### **CONNECTION TO CURRICULUM**

*Science*

#### **TEACHER PREPARATION TIME**

*1.5 hours*

#### **LESSON TIME NEEDED**

*4.5 hours      Complexity: Basic*

### **OBJECTIVES**

Students will

- Classify animals
- Understand the benefits of stereoscopic vision
- Demonstrate their ability to make accurate and detailed observations
- Describe their observations in written form
- Draw and identify an unknown using a written description about the unknown
- Use various types of equipment and tools to aid in making observations
- Assess other students descriptions for accuracy

### **NATIONAL STANDARDS**

#### **National Science Education Standards (NSTA)**

##### *Science as Inquiry*

- Understanding of the nature of science
- Skills necessary to become independent inquirers about the natural world

##### *Life Science Standards*

- Characteristics of organisms
- Organisms and environments

## MANAGEMENT

The first activity is a classification activity and in no way is a complete classification of Phyla, but it should serve to introduce the concept of organism classification.

The teacher will need to group the students and prepare animal classification bags and the two-page classification chart for each group.

The second activity demonstrates the significance of stereoscopic vision. The activity calls for the student to thread a needle with one or two eyes. This portion of the activity may be substituted with something with fewer safety issues associated with it. Stacking blocks, etc., for example.

The final series of activities requires the assembly of a “craft creatures” in advance. Suggestions may be found at <http://ares.jsc.nasa.gov/ares/education/program/fingerprints.cfm>

## CONTENT RESEARCH

The animal kingdom can be classified into two groups—the vertebrates and the invertebrates.

Vertebrates are animals with backbones and can be classified into five subgroups: mammals, birds, fish (four classes), reptiles, and amphibians.

The invertebrates are classified into many groups but for this activity will only be sorted into four subgroups: ringed worms, arthropods (insects, spiders, and crabs), mollusks (slugs, squid, and snails), and echinoderms (spiny-skinned animals like sea stars, sea urchins, and sand dollars).

Animals within each grouping have traits that separate them from the other groups. The benefits for many of these traits are apparent, whereas others are more subtle. Stereoscopic vision is a trait enjoyed by humans. Students will conduct simple demonstrations of depth perception.

Once scientists have made their observations of objects and living things, it is essential for them to be able to accurately convey this information to their colleagues. The “Creature Feature” activities focus on the use of appropriate descriptive language in science.

## LESSON ACTIVITIES

### Animal Antics

Student teams will be creating and using a classification chart to separate small cards with animal pictures into the respective animal classification groups. Each group will be awarded points by the teacher for the correct classification and placement of the animal cards.

[Animal Antics](#)

## MATERIALS

### Animal Antics: (p.21)

[Animal Antics](#)

#### Per Student

- Animal book pages (p. 24)
- Data Chart (p. 27 )
- Graphing Sheet (p. 28)
- #19 rubber bands

#### Per Group

- Animal bags
- Classification Chart (pp. 25–26)
- Scissors
- Tape
- Animal Picture Sheet (p. 29)

\*Bags may be supplemented with some or all of the following: animal cookies, crackers that look like fish, candy shaped like worms, or plastic bugs, spiders, snakes, and lizards.

***No two bags should be the same.***

### Are Two Eyes Better Than One? (p.47)

[SciFiles](#)

#### Per Group

- Assortment of different size needles
- Thread
- One large cup
- One small cup
- Water
- Paper towels
- Soft ball
- Science journal
- Blindfold (optional)

### Creature Feature

[Creature Feature](#)

- Small, opaque container with lid (one per creature)
- Student Sheet for Activity 1 The Truth is Out There (one per student)
- A variety of arts and crafts items to make creatures (for example: pipe cleaners; plastic
- beads of various sizes, shapes and colors; "googly" eyes, feathers, etc.)
- Pencil, highlighter and box of map pencils (one per student)

## Are Two Eyes Better than One?

Students will conduct simple activities that reinforce the benefits animals with two stereoscopic eyes enjoy.

### Creature Feature

This activity is made up of four parts: “The Truth is Out There,” “Who Knows?,” “Tell it like it is!,” and “Truth Revealed.”

<http://ares.jsc.nasa.gov/education/websites/astrobiologyeducation/Data/creaturefeatureactivity.pdf>

The “Truth is Out There” is an activity that challenges the students to use appropriate descriptive language in a scientific observation.

The “Who Knows?” activity provides the opportunity for one student to draw a creature being described by another student.

“Tell it Like it is!” encourages the proper use of scientific instruments in collecting detailed data in an observation.

The “Truth Revealed” is the assessment phase of the activity that looks specifically at the completeness of the student observations.

### ADDITIONAL RESOURCES

Astrobiology in Your Classroom: Life on Earth...and Elsewhere?

<http://nai.arc.nasa.gov/library/downloads/ERG.pdf>

### DISCUSSION QUESTIONS

#### Animal Antics

- How do common characteristics help you classify animals? *Comparisons of like qualities allows you to move an animal into one group or another, until there are no more similarities. This is a dichotomous key approach—yes or no responses through a listing of characteristics*
- How would you sort the mammals into smaller categories? *Look for similarities or differences within the sorted groups and move animals into the new groups*
- Can you devise an animal classification system that is different from the one given on the chart? Explain. *Student answers will vary*
- What animals would you like to add to the chart? Where would they fit? *Student answers will vary*
- Think of another animal to add to each group. *Student answers will vary*

#### Are Two Eyes better Than One?

- Why was it challenging to do some of the previous activities with one eye closed? *Student answers will vary, but answers should lead to a loss of depth perception*
- What would happen if your eyes were spaced farther apart? Would you still be able to see the same way? *Student answers will vary*
- Why is it important for the Mars rovers to have stereoscopic vision? *Student answers will vary, but there should be an understanding that they added value of depth in making observations*

#### Creature Feature

- Were the descriptions accurate? *Student answers will vary*
- What might have helped you to better understand what the other students were describing? *Student answers will vary*
- What skills do scientists need to have in order to describe a new species? *Student answers will vary. Some answers should include a common vocabulary or use of terms in descriptions and measurements*
- Could you tell from the description what tools were used to collect more information about the creature? *Student answers will vary*

Additional student questions are included in the pdf guide.

## **ASSESSMENT ACTIVITIES**

Assess student teams by the number of points achieved in the classification of their animal bag contents. Student notebooks/journals provide the observations and data required should the instructor wish to employ multimedia options for student presentations via podcasts or videos.

“Creature Feature” has a student assessment component built into the final portion of the activity.

## **ENRICHMENT**

- Read Rudyard Kipling’s “Just So Stories” and write your own animal story to explain how an animal got its unique features.
- Create a classroom classification chart on butcher paper and paste animal pictures on the chart in the appropriate places.
- Research the other four classes of fish and the other classes of invertebrates that were not included in the chart.
- Students conduct online research and make a Venn diagram to compare and contrast the types of animals that have stereoscopic and monocular vision.